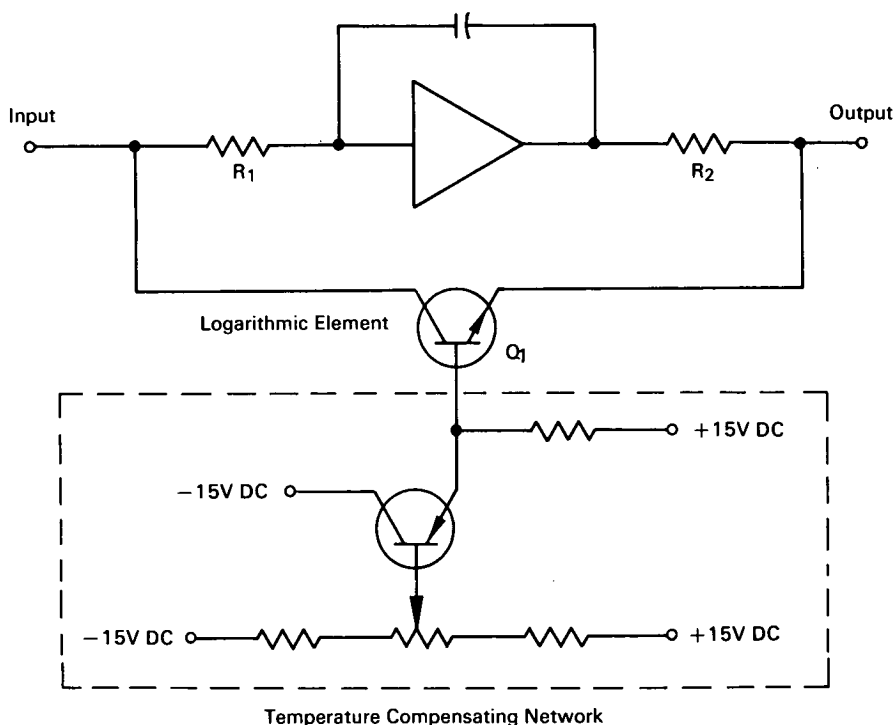


NASA TECH BRIEF



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Transistor Circuit Increases Range of Logarithmic Current Amplifier



The problem:

To design a logarithmic current amplifier capable of operating throughout a range of 10^{-12} to 10^{-2} amperes. Amplification through this range can be obtained by cascading amplifiers in incremental steps but this creates problems of physical volume, reliability, calibration, and difficult operation.

The solution:

A circuit that provides logarithmic amplification of an input range from 10^{-12} to 10^{-2} amperes by combining a commercially available amplifier with a silicon epitaxial transistor.

How it's done:

The principle of operation involves the placement of a logarithmic feedback element across the amplifier. The circuit operates on the transfer function of the silicon epitaxial transistor, Q_1 in which the output voltage is proportional to the log of the input current. Resistors R_1 and R_2 and the capacitor stabilize the circuit. That portion of the circuit within the dotted lines serves only to provide temperature compensation for Q_1 . Input impedance is 10 megohms and input signal strength is 10^{-12} to 10^{-2} amperes.

(continued overleaf)

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
AEC-NASA Space Nuclear Propulsion
Office
U.S. Atomic Energy Commission
Washington, D.C. 20545
Reference: B66-10350

Patent status:

No patent action is contemplated by NASA.

Source: G. Gilmour
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